Electronic Supplementary Information

A Black Phosphorous/Ti_3C_2 MXene Nanocomposite for Sodium-Ion Battery: Combined Experimental and Theoretical Study

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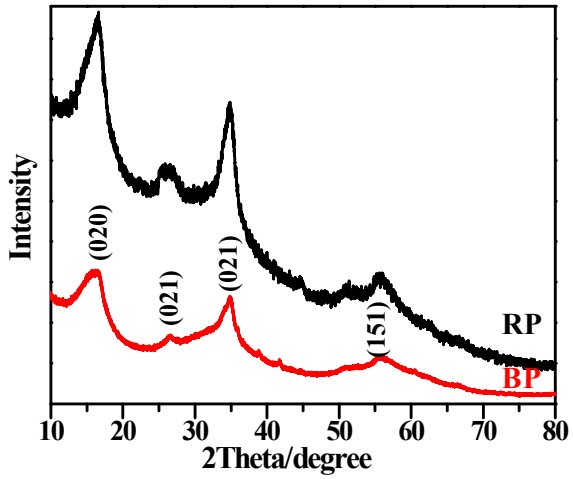

Fig. S1 XRD patterns for RP and as-prepared BP after ball milling.

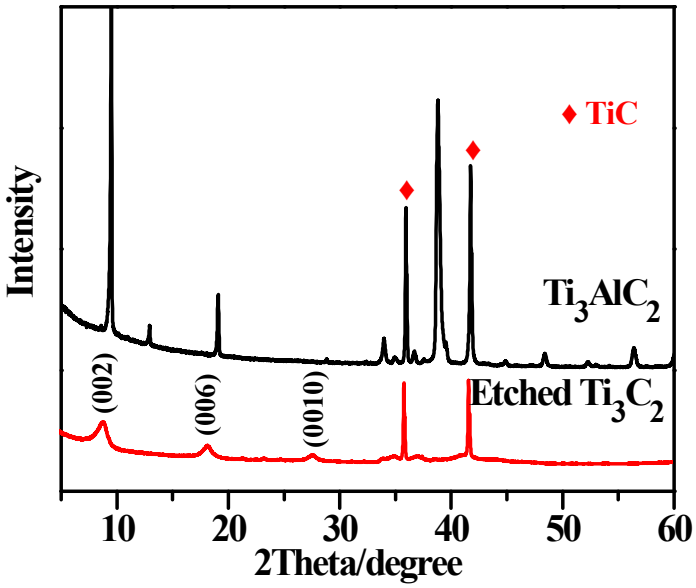

Fig. S2 XRD patterns of MAX phase Ti_3AlC_2 and products after etching by HF.

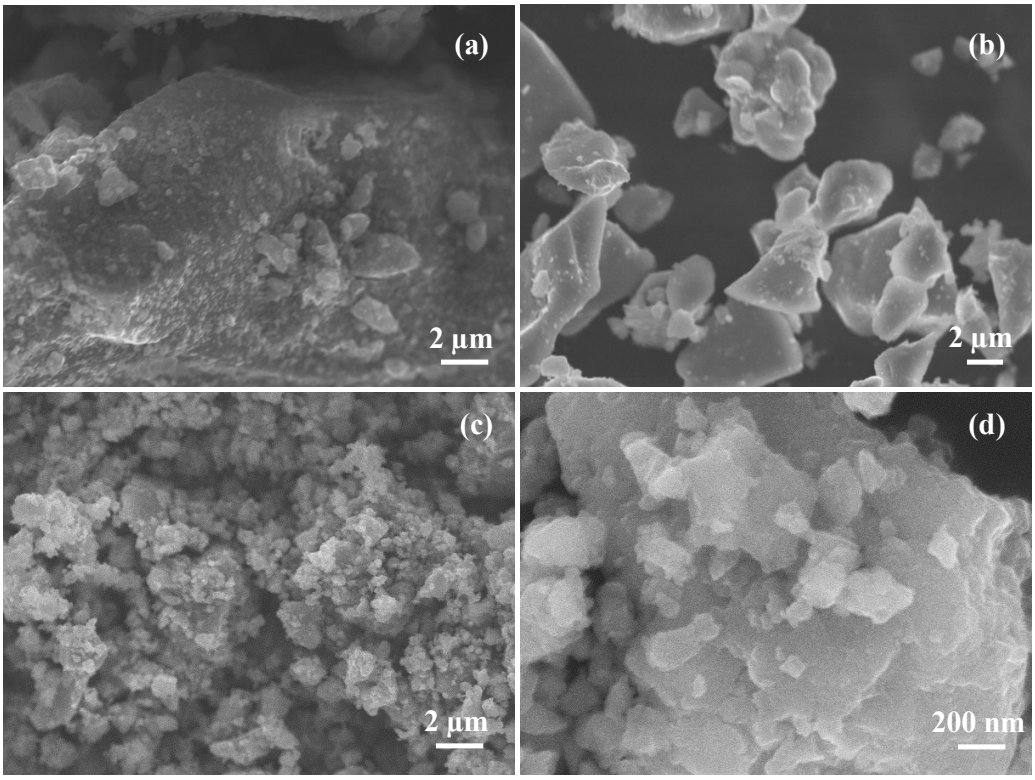

Fig. S3 SEM images of the RP raw materials (a), RP after grind milling (b) and BP after ball milling (c-d).

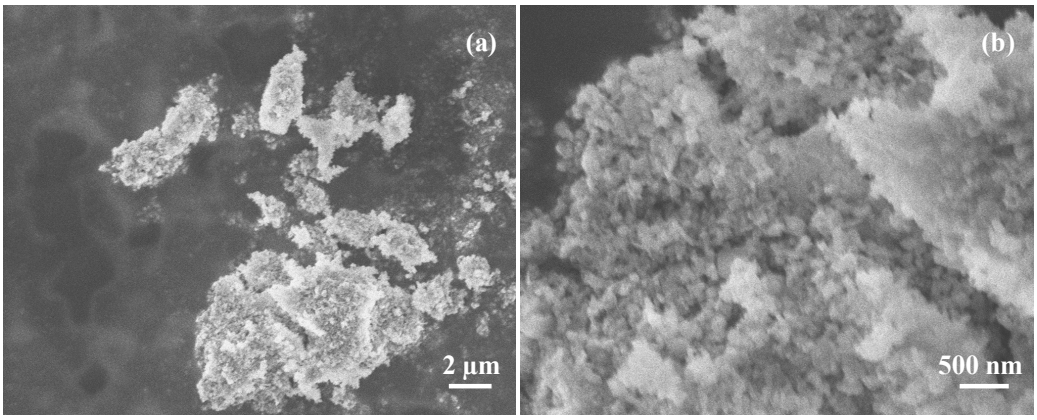

Fig. S4 SEM images of BP after sonicating in DMF solution.

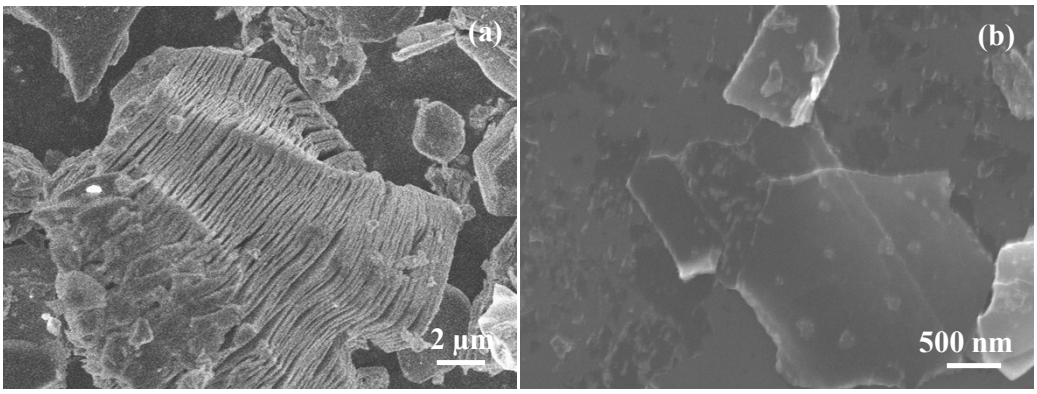

Fig. S5 SEM images of bulk Ti_3C_2 (a) and exfoliated Ti_3C_2 nanoflakes in deionized water (b).

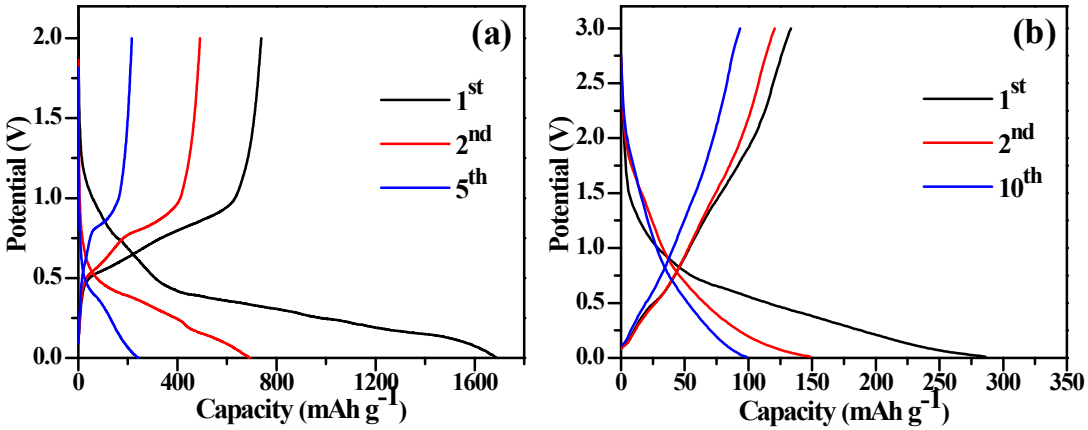

Fig. S6 Charge-discharge profiles for the 1st, 2nd and 5th cycles of the BP electrode from 0.1 V-2.0 V (a) and the 1st, 2nd and 10th cycles for the Ti_3C_2 electrode from 0.01 V-3.0 V at a current density of 0.1 A g^{-1}.

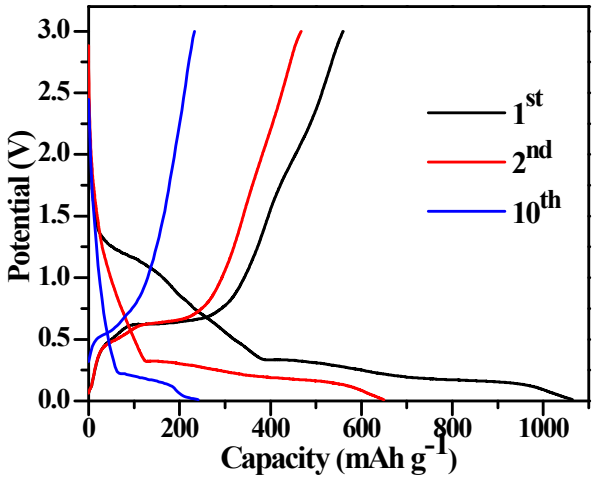

Fig. S7 Charge-discharge profiles for the 1st, 2nd and 10th cycles of the BP/Ti_3C_2 electrode from 0.01 V-3.0 V at a current density of 0.5 A g^{-1}.

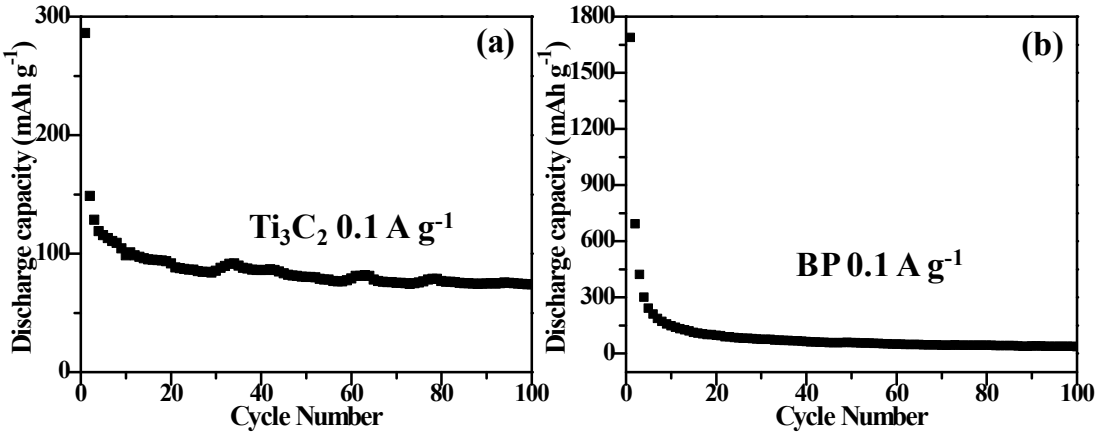

Fig. S8 Cycling performance of the BP electrode (a) and Ti_3C_2 electrode (b) at a current density of 0.1 A g^{-1}.

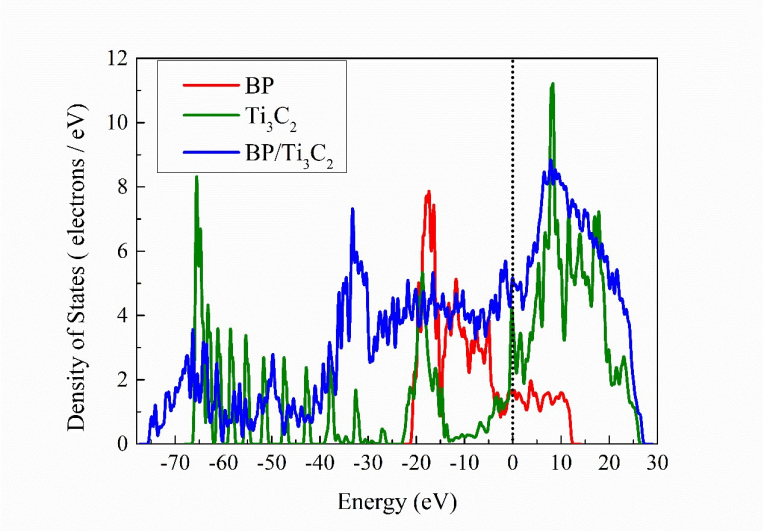

Fig. S9 s orbit PDOS of BP, Ti_3C_2, and BP/Ti_3C_2 composite.

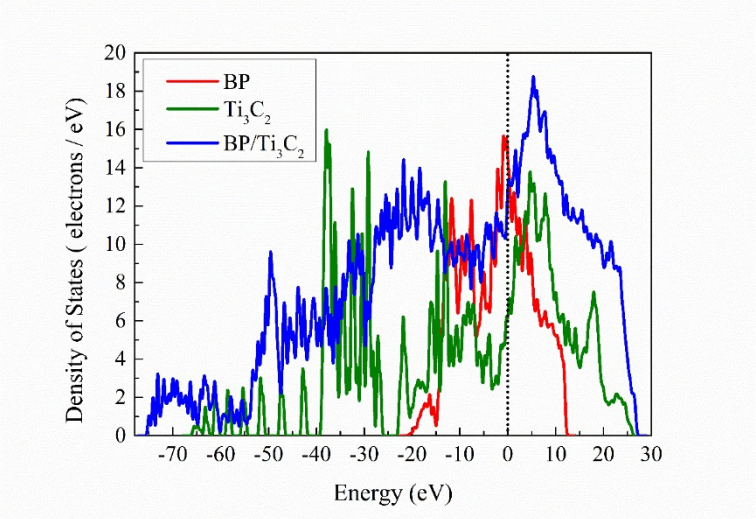

Fig. S10 p orbit PDOS of BP, Ti_3C_2, and BP/Ti_3C_2 composite.

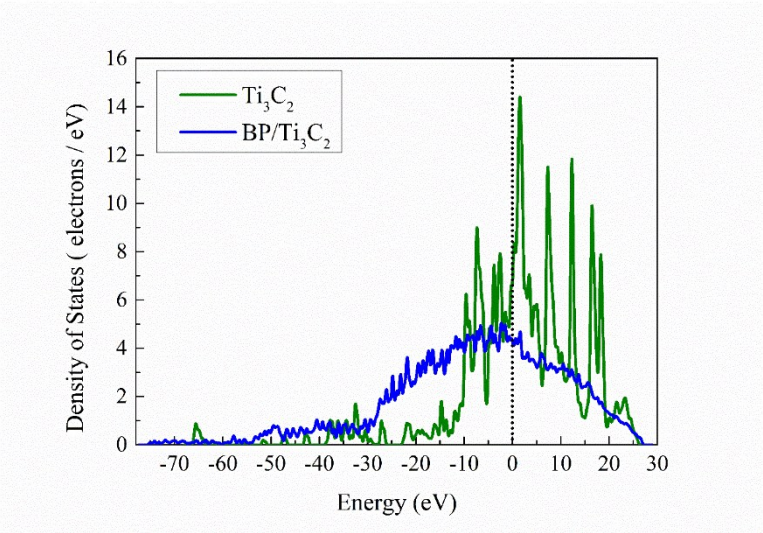

Fig. S11 d orbit PDOS of BP, Ti_3C_2, and BP/Ti_3C_2 composite.